

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
28 July 2005 (28.07.2005)

PCT

(10) International Publication Number
WO 2005/068965 A1

(51) International Patent Classification⁷: **G01M 11/00**

(21) International Application Number:
PCT/BR2005/000004

(22) International Filing Date: 13 January 2005 (13.01.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
BR-PI-0400231-8 13 January 2004 (13.01.2004) BR

(71) Applicant (for all designated States except US): **FIBER-WORK COMUNICAÇÕES ÓPTICAS LTDA-ME** [BR/BR]; Rua Alfredo da Costa Figo, No. 280, Jd Santa Candi, da, Campinas-SP, Brasil- BR, CEP: 13.087-534 (BR).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **BARCELOS,**

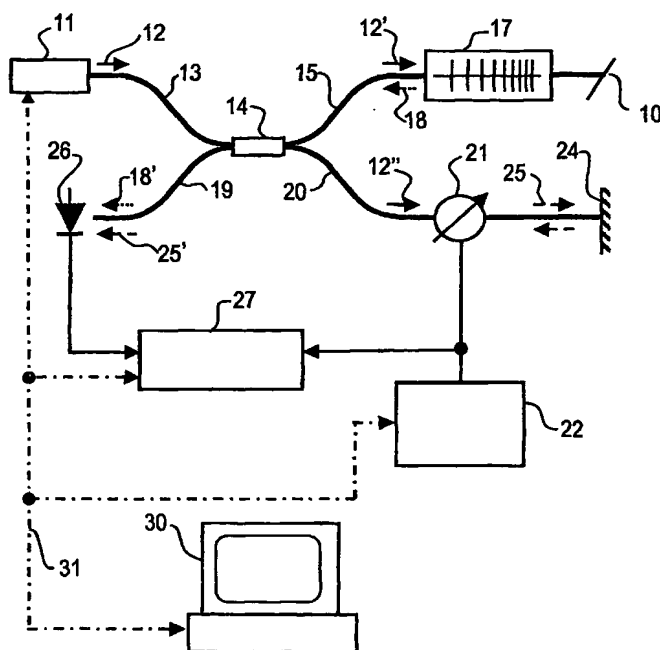
Sérgio [BR/BR]; Rua Alfredo da Costa Figo, No. 280, Jd Santa Candi, da, Campinas-SP, Brasil- BR, CEP: 13.087-534 (BR). **RANDO, Rafael Faraone** [BR/BR]; Rua Guerino Gobbo, No. 625, Jd. Glória, Americana-SP, Brasil- BR, CEP: 13.468-250 (BR). **SASAKI, Nelson Kiyoshi** [BR/BR]; Rua Bernadino de Campos, No. 515-apto. 74-, Centro Campinas- SP, Brasil-BR, CEP: 13.010-151 (BR). **RIGON, Elso Luiz** [BR/BR]; Estrada da Rhodia, No. 5555 Primavera 31, Barão Geraldo, Campinas- SP, Brasil- BR, CEP: 13.085-850 (BR).

(74) Agent: **VILAGE MARCAS E PATENTES LTDA.;** Avenida Rio Branco, No. 37- 9º andar- sala 909, Centro, Rio de Janeiro- RJ, Brasil- BR, CEP: 20.090-003 (BR).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,

[Continued on next page]

(54) Title: SYSTEM AND METHOD FOR MEASUREMENT OF OPTICAL PARAMETERS AND CHARACTERIZATION OF MULTI-PORT OPTICAL DEVICES



(57) Abstract: System and method for measurement of optical parameters and characterization of multiport optical devices constituted by process control systems, one or more sources of optical test signal (11) (tunable laser source), optical circuit including optical fiber and several other optical components arranged so as to constitute an interferometric optical arrangement, optical connectors, optoelectronic interfaces, photodetectors, analogical electronic circuits, digital electronic circuits for digital signal processing and electronic circuits for data acquisition, the test and reference optical signals traversing paths with any lengths, that can be identical or distinct, the optical signal traversing at least one of said paths of interferometer being phase- and/or frequency-modulated. The signals of both interferometer arms are summed at a same photodetector (26) that translates to the electric domain the heterodyning of the optic signals, which contain the information of the optical characteristics of the DUT (17) (device under test), the transfer of the optical signals between the diverse ports of the DUT being described by means of the Optical "S"-Parameters where each "S_{xy}" parameter is represented using the formalism of Jones (Jones matrix) and/or the formalism of Muller (Muller matrix) and where all the determinations of the optical

characteristics of the DUT (17) (bandwidth, phase, time delay, chromatic dispersion, 2nd order chromatic dispersion, reflectance, reflection coefficient, transmittance of the port "y" to the port "x" and vice versa, insertion loss, polarization dependent loss, polarization mode dispersion (DGD/PMD), 2nd order DGD, etc.) are based on said "S_{xy}" parameters.



PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, ML, MR, NE, SN, TD, TG).

(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.